fore, it is presumably of the constitution AAbb. This line will be used to study gene "B" and its possible interactions with the various partial fertility-restoring genes.

It is interesting to note that the use of inbreds of the constitution AAbb would permit, without detasseling at any stage, the production of double crosses giving only fertile plants in the farmer's field:

(1) cms_1 aaBB (sterile) x (2) aaBB → cms_1 aaBB (sterile)

(3) cms_1 AAbb (sterile) x (4) AABB → cms_1 AABb (fertile)

cms_1 aaBB (sterile) x cms_1 AABb (fertile) →

cms_1 AaBB (fertile)
cms_1 AaBb (fertile)

Even if inbred (1) above were replaced by the commonly used seed parent WF9, the proportion of fertiles to steriles in the double cross would be 3:1.

2. Employment of Vestigial-glume in screening for sources of smut resistance.

In the process of backcrossing material carrying the gene *Vg* to a series of inbred lines, vestigial-glume plants were noted to be strikingly more susceptible to corn smut, and often to ear rots, than normal sibs. If this observation holds generally true, *Vg* should prove a useful tool to screen for better sources of resistance to smut and perhaps ear rots, as was done by LaRue, using *Cg* to screen for rust resistance.

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1. Preliminary biochemical studies on the action of a gene controlling meiosis in maize.

In maize a recessive gene called "ameiotic" has been found (Rhoades, MNL 30) which prevents meiosis and leads to almost complete sterility. Occasionally a few kernels may be produced, but these result from unreduced diploid eggs. Plants of the constitution *Am Am* and *Am am* (both called normal plants throughout this discussion) are phenotypically completely indistinguishable from those of the constitution *am am* (called "ameiotic" throughout) except at the late reproductive stage. In the ameiotic plants tassels and ears appear normal, but the anthers fail to develop beyond a certain stage. They remain covered inside the glume: and later the whole spikelet appears chaffy. The ears either produce no seeds or a few seeds from diploid eggs.

Biochemical studies have been undertaken with a threefold object (1) to distinguish the phenotypes at an early stage, (2) to detect changes leading to the failure of meiosis (3) to obtain any possible clue for inducing meiosis in the ameiotic plants.

The experimental results obtained so far can be discussed conveniently under two heads: (a) Paper chromatographic studies of amino acids and sugars etc. (b) Studies with nucleic acids and thei precursors.

(a) Paper chromatographic studies for amino-acids etc:
Roots, leaves, anthers and ears have been analysed for free ninhydrin positive substances, sugars and ultra-violet fluorescent compounds by ascending, descending or two dimensional paper chromatography of alco and water extracts. No difference has so far been observed with resp to sugars and amino acids or other ninhydrin positive compounds in ro leaves and early stages of anthers and ears. But in later stages of anther and ear, differences have been observed in ninhydrin positive though their exact nature has not yet been determined.

A clear difference, however, has been indicated with respect to an ultraviolet fluorescent spot in all the organs examined. In chrom grams of both water and alcohol extracts of roots, leaves, anthers or ears of normal as well as ameiotic plants two distinct fluorescent sp appeared consistently along with other variable ones. One of these t spots was yellow fluorescent and had an R_f of 0.33, the other showed blue-green fluorescence and had an R_f of 0.38. (Both R_f's in ascendin run with Tertiary Butanol: Glacial Acetic acid: Water solvent in 3: proportion.) In the normal plants (Am Am or Am am) the yellow fluore cent spot was either very faint or absent. In the ameiotic plants th spot was quite bright. To eliminate the error due to a concentration factor the relative brightness of the two adjacent spots was taken to be a better criterion. The y.f. spot was faint compared with the blu green spot in the normal plants and was as bright as the other one in the ameiotic plants. However, it may be mentioned that further obser tions in families segregating for the am gene as well as in families out am are necessary before attempting to characterize or identify th compound.

(b) Studies with nucleic acids and their precursors:
Nucleic acids (DNA and RNA) and their precursors, such as nucleotides nucleosides and free purine and pyrimidine bases, have been extracted from young ears in different fractions and studied with combined spec trophotometry and paper chromatography.

Of the several fractions in the extraction process a difference between normal and ameiotic plants has been observed in two fractions

(i) fraction supposed to contain only RNA and (ii) fraction containing the pyrimidine bases obtained from the apurinic DNA.

The first fraction showed a clear absorption peak at 260 mμ and differed only in the height of the peak indicating a quantitative difference. The possibility of a qualitative difference in terms of base composition has not been explored.

The second fraction showed distinctive patterns of u.v. absorption spectra between 200-300mμ. While the extract from normal plants had a big peak of absorption at 280mμ, that from ameiotic plants showed less absorption at the same wavelength. Chromatographic separation of the bases followed by systematic elution and further spectrophotometric analysis seemed to indicate differences in the components of the fraction. These differences might be due to one or both of two causes: (1) a difference in the composition of the nucleic acid, (2) a difference in the amount or nature of proteins. That the proteins do not differ in their amino acid composition in normal and ameiotic plants has been indicated by a chromatographic study of hydrolysates of leaf proteins, though the same has not been tested in the reproductive structures.

Further studies along these lines and concerning other biochemical aspects are in progress.

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2. Preferential pairing.

In the last issue of the M.G.C.N.L. it was reported that in tetraploids heterozygous for a structural aberration (inversion 3a 3L .4- 3L .95) preferential pairing was proved to be operating. The evidence cited was genetic. The backcross ratio of the control duplex (AAaa) was 4.03A : 1a and that of the structural heterozygote duplex was 7.11A : 1a. The inverted segment is marked with A_1 and the corresponding standard segment with a_1. The difference in these ratios can only be explained by assuming that preferential pairing occurs. In the event of preferential pairing when two bivalents are formed only gametes of the type Aa would be formed. Preferential pairing in a quadrivalent would also lead to an excess of Aa gametes, because firstly double reduction cannot take place and secondly the chromosomes of a quadrivalent do not disjoin at random, there being a frequency greater than 1/3 of alternate disjunction.

Now, it is possible to present some cytological evidence which indicates that preferential pairing does occur and also to make an estimate of its magnitude, something which is very difficult to do from genetic data.

Cytological observations were made on the chromatid bridge frequency of the simplex structural heterozygote as compared with that of the duplex